The SaPPART COST Action
Main outcomes and deliverables

High Quality Positioning: a Key to Success for Autonomous Driving

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Content

- COST : European Cooperation in Science & Technology
- Context of SaPPART
- The SaPPART COST Action
- Scientific Missions - STSM
- Deliverables
  - 1.White Paper; 2.Handbook; 3.Guidelines
- Perspectives

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EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

EU COST Action

- **European Cooperation in Science and Technology** (**COST**) framework for cooperation in science and technology
  - Enhance research progress through creation of new international networks
  - Allow scientists to grow their ideas by sharing them with their peers
- Funding period of 4 years
- The funding covers
  - Networking activities such as meetings, conferences, workshops, short-term scientific exchanges, training schools, publications and dissemination activities
  - COST does not fund research itself

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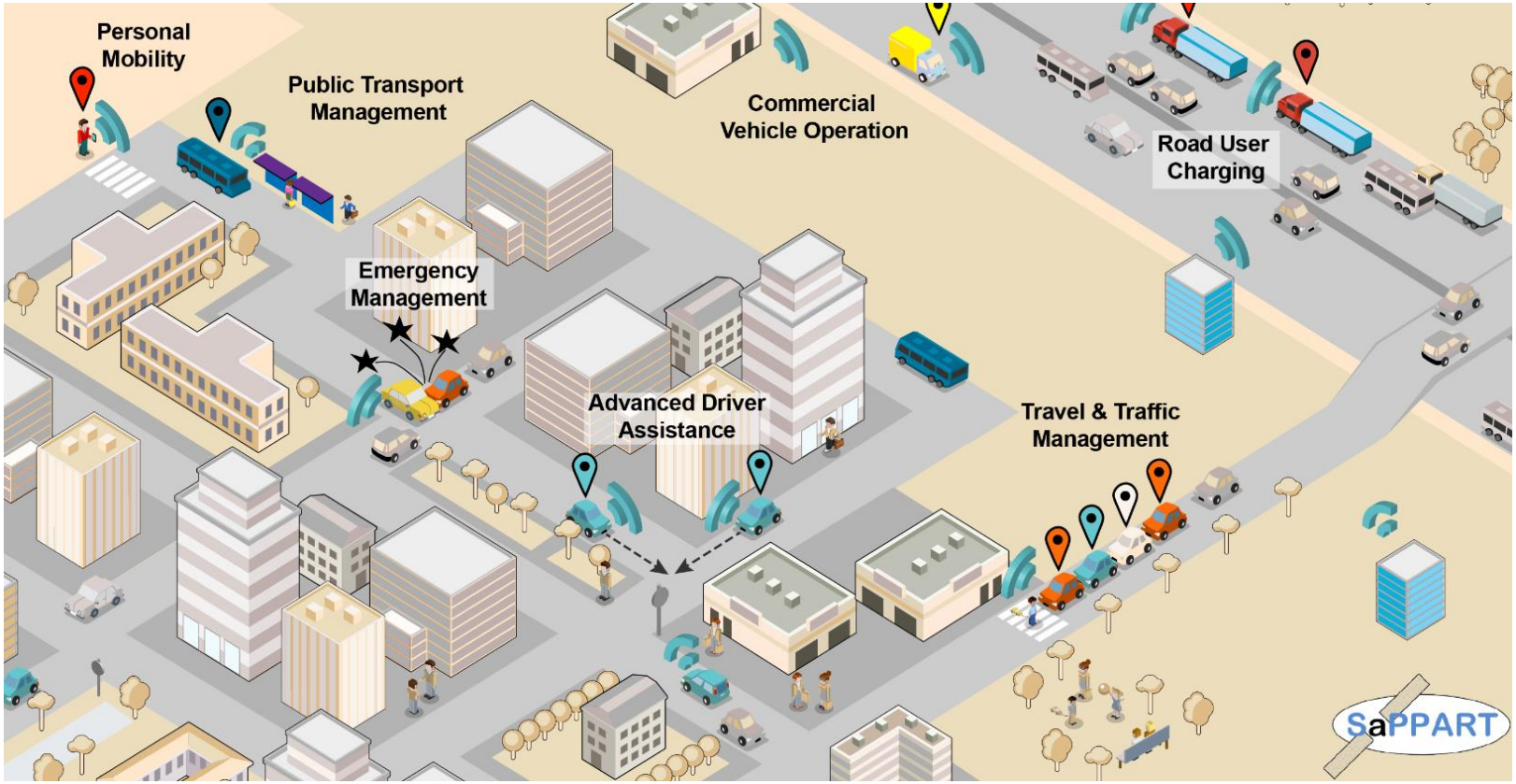
SaPPART "Big Picture"



- Increasing capacity, improving safety and reducing congestion
- ITS represent 50% of the GNSS market

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Context of SaPPART Action

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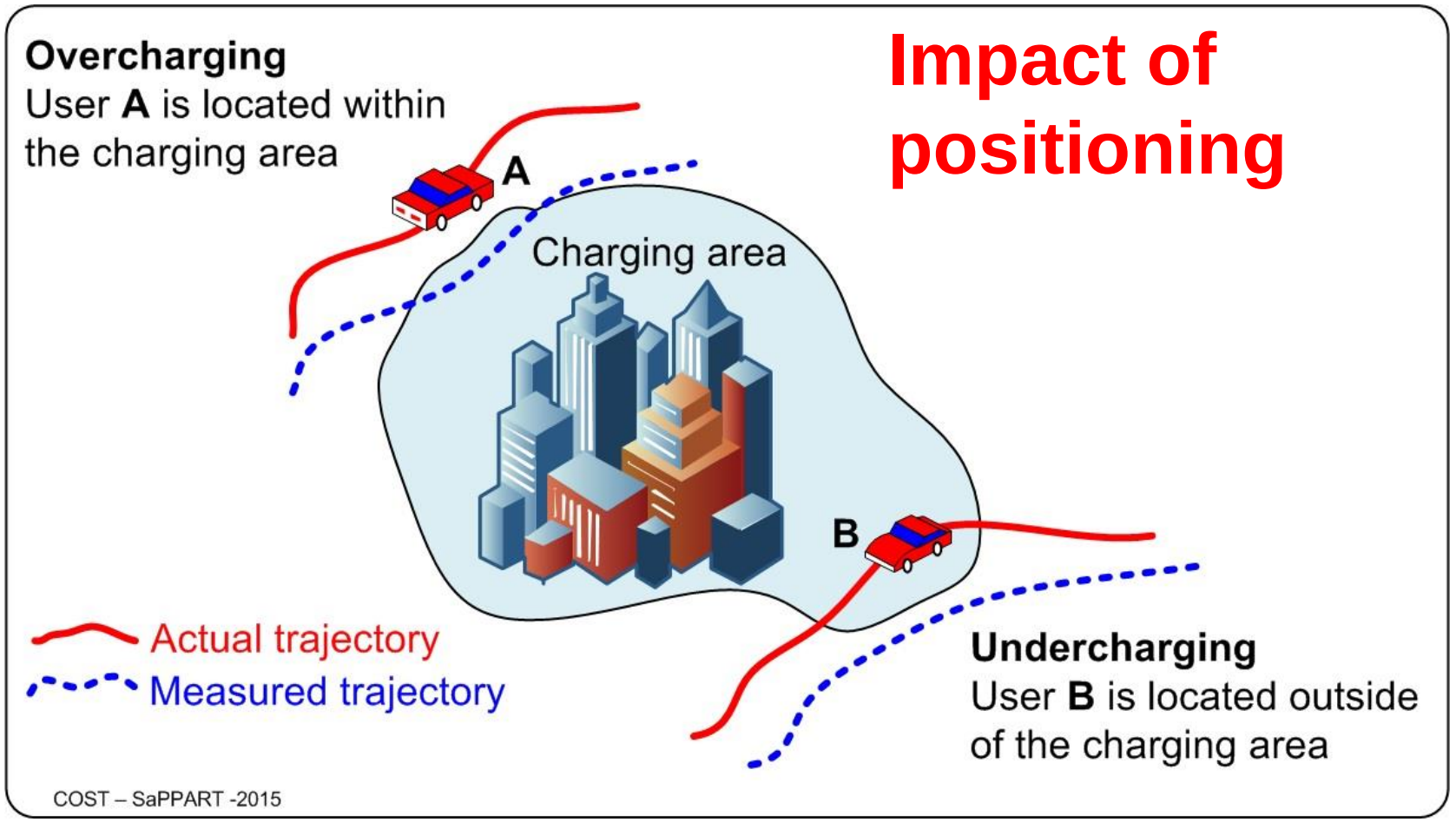
Context of SaPPART Action



Impact of positioning

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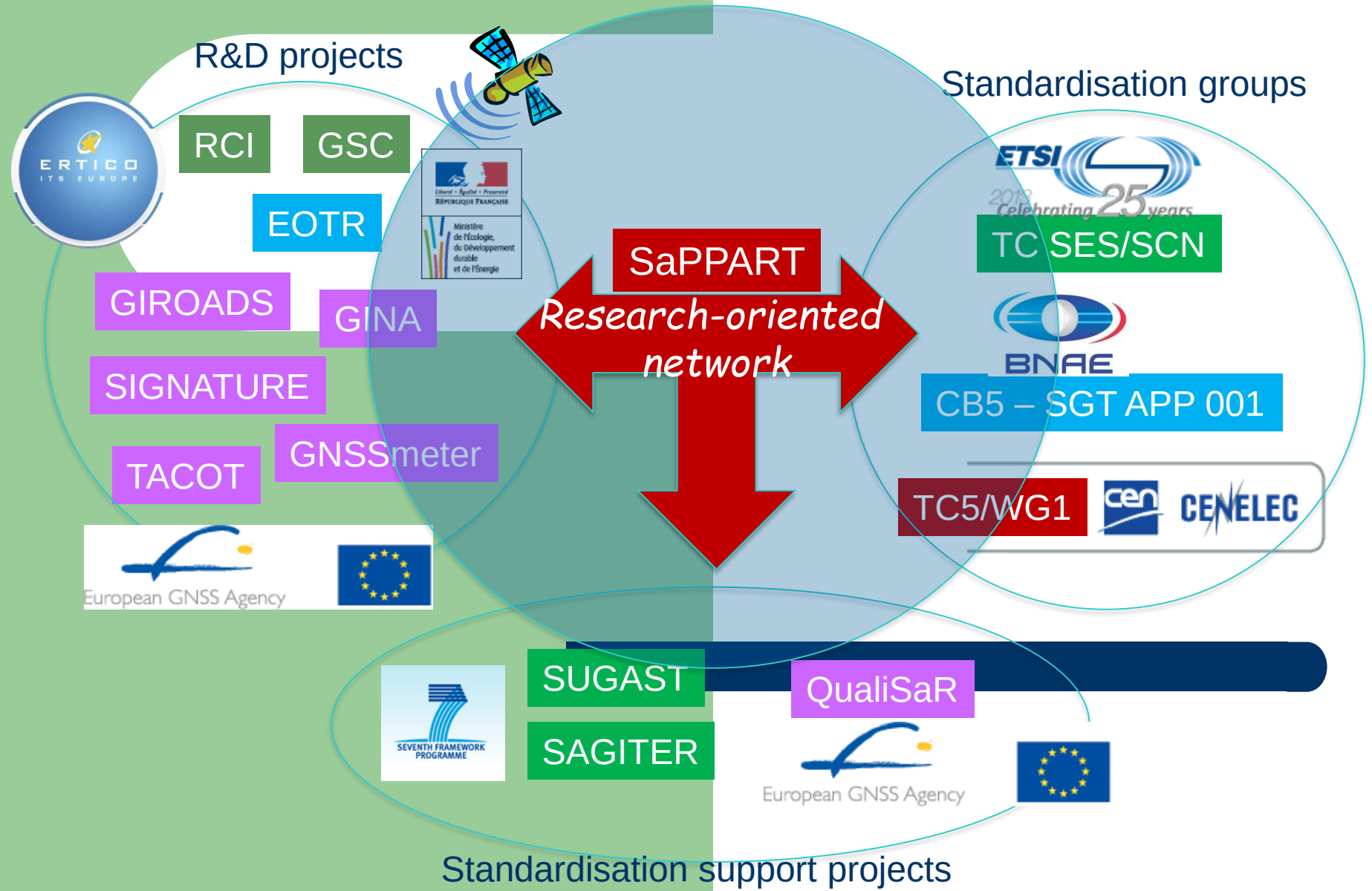
Context of SaPPART



EU COST SaPPART

- SaPPART 2013-2017
- Members from 23 countries
- SaPPART's goals
  - Bring together leading **experts in GNSS, ITS** and mobility
  - Provide **reference documents** and guidelines for implementing specific GNSS based ITS application
  - Framework for the definition of the **performance** of the GNSS-based positioning terminals in ITS
  - Procedures to assess these performances
  - Disseminate for better understanding of the **potential and limitations of GNSS**

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SaPPART's tools

- Working groups
- Short Term Scientific Missions (STSMs)
- Workshops
- Documents
  - White paper
  - Handbook: link the GNSS-based positioning terminal service levels to the application Key Performance Indicators (KPIs)
  - Guidelines: for performance assessment tests of GNSS-based positioning terminals (GBPT)
- Data-set
- www.sappart.net (all documents)

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Scientific Mission - STSM

- To support missions (exchange visits) with the aim at strengthening the existing networks
- To allow scientists to go to an institution in another COST Country
- To foster collaboration, to learn a new technique
- Mission form 1 week up to 3 months

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STSM

- France
- Finland
- UK
- Sweden

Name of applicant / Organization / Country	Host / Organization / Country	Period
Dr Franc Dimc / University of Ljubljana / (SI)	David Betaille / IFSTTAR / Nantes (FR)	2017-17-04 to 2017-04-20
Dr Valerie Renaudin / IFSTTAR / Bouguenais CS4 (FR)	Laura Ruotsalainen / FGI / 02430 Masal (FI)	2017-02-26 to 2017-03-10
Mr Calogero Cristodaro / Politecnico di Torino / Turin (ITALY)	Laura Ruotsalainen / Finnish Geospatial Research Institute (FGI) / Masal (FI)	2016-11-07 to 2016-11-18
Mr Andrej Štern / University of Ljubljana / Ljubljana (Slovenia)	Valérie Renaudin, IFSTTAR, Nantes (FR)	2016-09-11 to 2016-10-01
Dr Matti Raitoharju / Tampere University of Technoloy / Tampere (FI)	Lennart Svensson / Chalmers University of Technology / Gothenburg (SE)	2016-04-01 to 2016-04-30
Dr David Betaille / Ifsttar / Marne-la-Vallée (FR)	Paul Groves / University College London / London (UK)	2016-06-19 to 2016-07-02

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STSM

- Poland
- Denmark
- Croatia
- Norway

Mr. Miguel Ortiz / IFSTTAR, Nantes (FR)	Ola Martin Lykkja / Q-Free ASA / Oslo (NO)	2016-03-07 to 2016-03-18
Dr Martti Kirkko-Jaakkola / FGI (Finland)	Centre for Transport Studies / Imperial College London / London(UK)	2015-10-19 to 2015-10-30
Dr Marko Sevrovic / University of Zagreb, Faculty of Transport and Traffic Sciences / Zagreb(HR) , marko.sevrovic@fpz.hr	Washington Yotto Ochieng / Imperial College London / London(UK)	2015-09-07 to 2015-09-18
Prof. L-F Pau / CBS / Denmark	Faculty of Forestry / University of Agriculture, Krakow / Poland	08 July-15 July, 2015

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STSM

- Greece
- Spain
- Switzerland

Mr. Svend-Peder Oseth Q-Free / Norway	FRANçOIS PEYRET / The French institute of science and technology for transport, development and networks (IFSTTAR),Nantes / France	27 July – 7 August, 2015
Dr Mohammad Zahidul Hasan Bhuiyan / Finnish Geodetic Institute, Kirkkonummi / Finland	FRANçOIS PEYRET / The French institute of science and technology for transport, development and networks (IFSTTAR),Nantes / France	2014-10-06 to 2014-10-17
Mr Harris Perakis / National Technical University of Athens / Greece	Mr Pierre-Yves Gilliéron / EPFL Lausanne, TOPO lab. / Switzerland	29th Sept. to 10th October 2014
Mr Carlos Moriana-Varo/ GMV AEROSPACE AND DEFENCE S.A.U./ Tres Cantos(ES)	FRANçOIS PEYRET / The French institute of science and technology for transport, development and networks (IFSTTAR),Nantes / France	2014-10-26 to 2014-11-07

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STSM

- **Valuable outcomes** for the Action
- Active **contributions from researchers** to the objectives of working groups
  - **Test measurements** under real conditions
  - **Record of trajectories** with several positioning sensors
  - **Assessment of the positioning quality**
    - Comparison to ground truth trajectory
  - **Characterization** of GNSS receivers
    - Classes of performance

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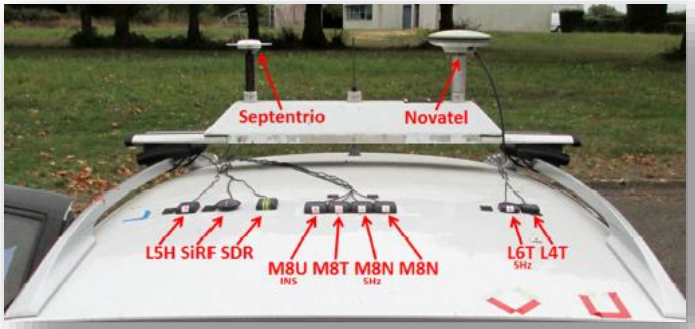
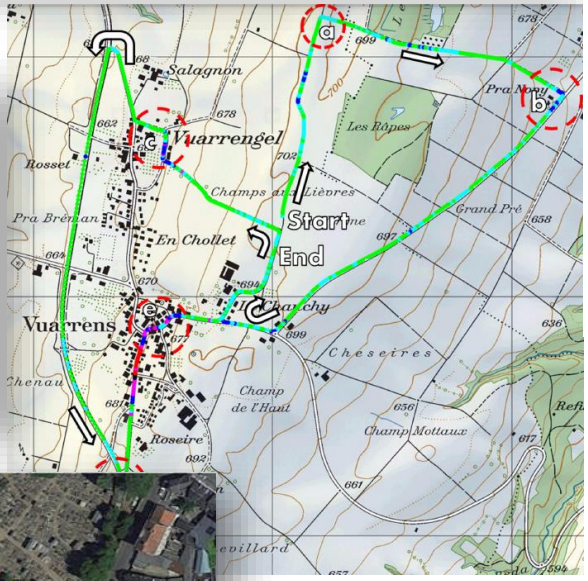
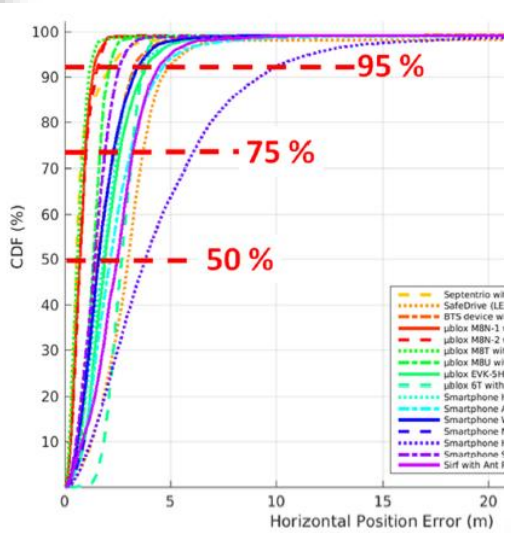
STSM







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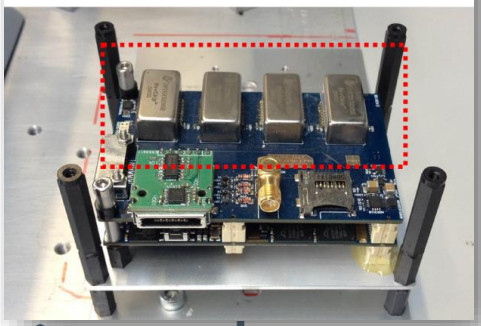

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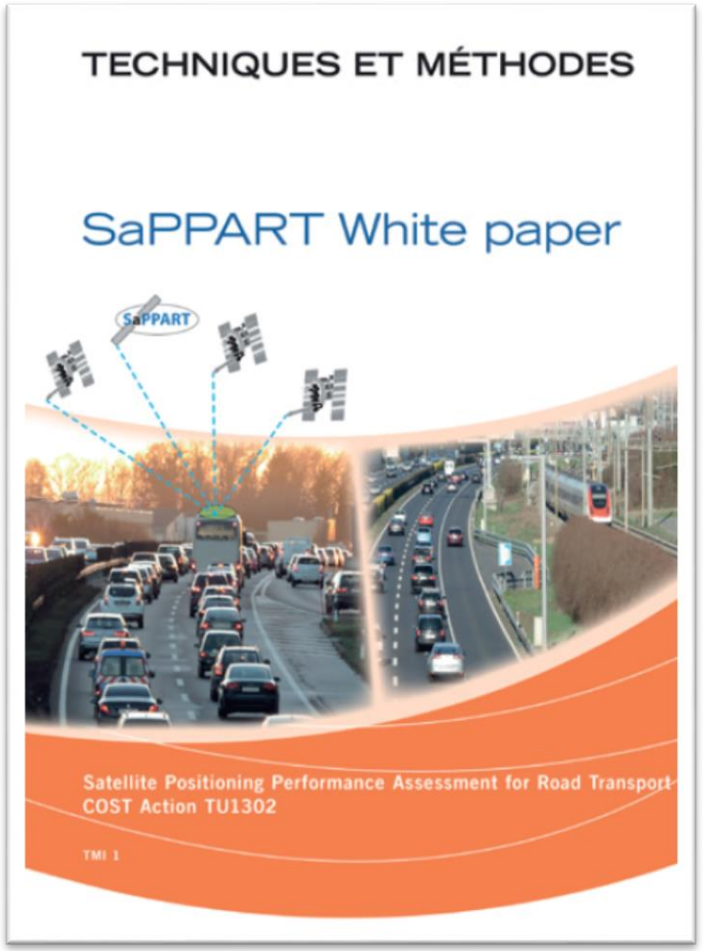
White Paper

- "Better use of Global Navigation Satellite Systems for safer and greener transport"
- Published by Ifsttar under creative commons license in 2015



- Available on www.sappart.net

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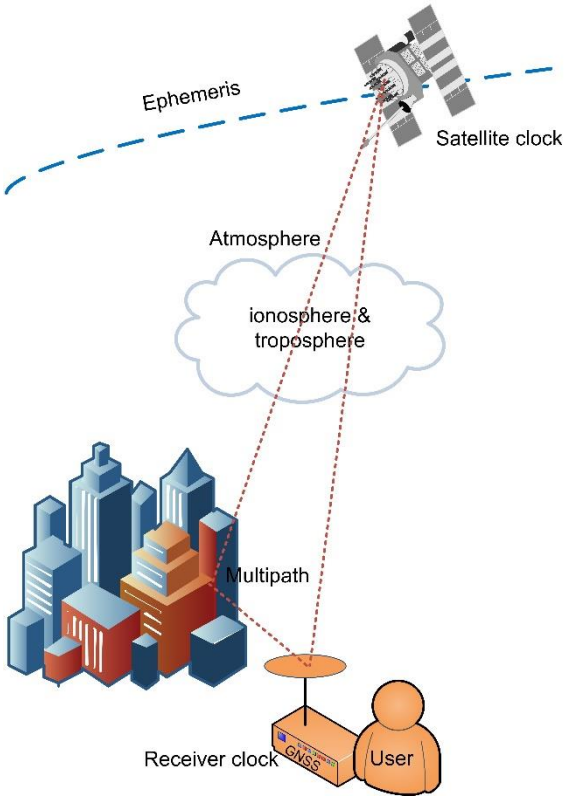
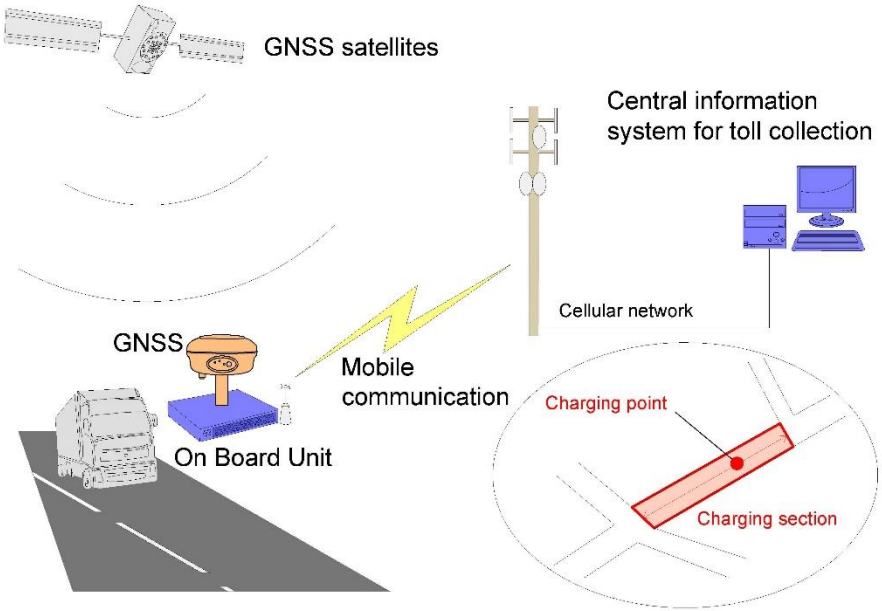
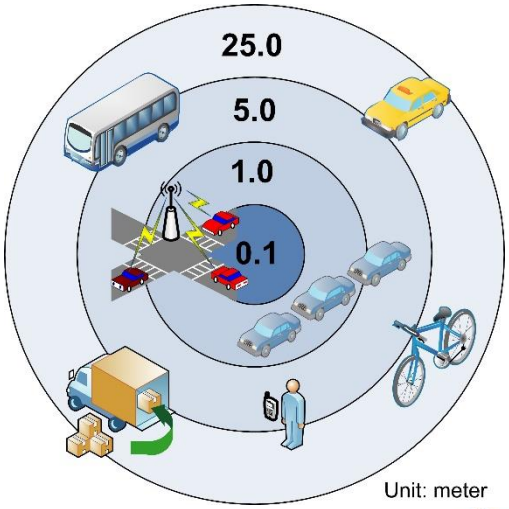
White Paper

- **Highlights**







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Booth of the GNSS European Agency (GSA)

ITS World Congress 2015 in Bordeaux (~9'000 participants)

- **Space technology** and **GNSS** have been presented as a main topic of interest
- Dissemination of SaPPART: booth, Special sessions, White Paper

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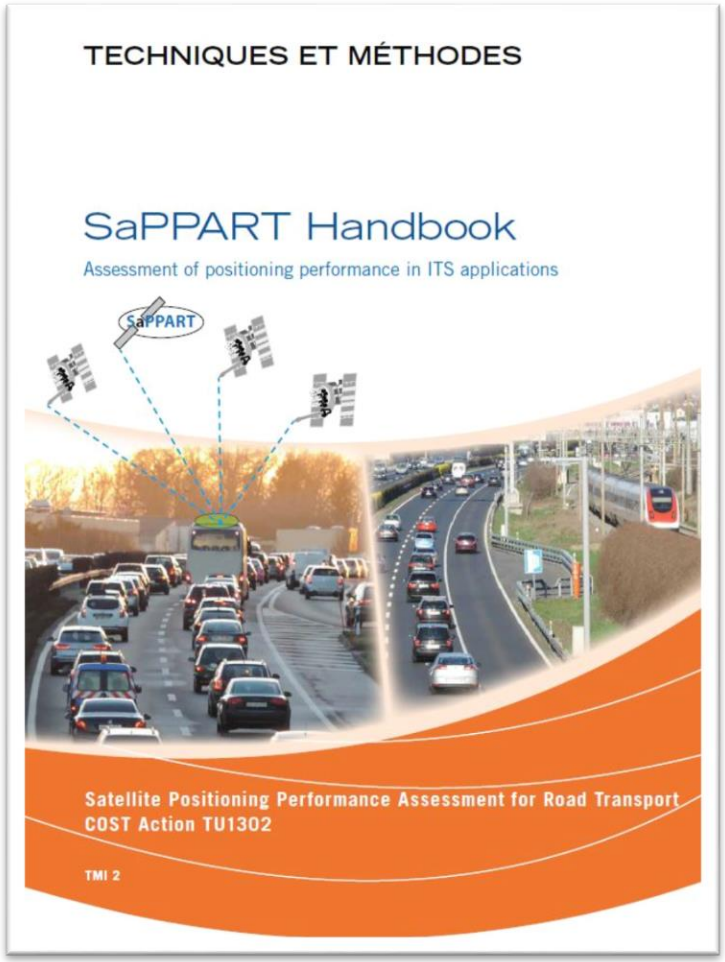
Handbook

- «Assessment of positioning performance in ITS applications»
- Published by Ifsttar under creative commons license in 2017
- Available on www.sappart.net



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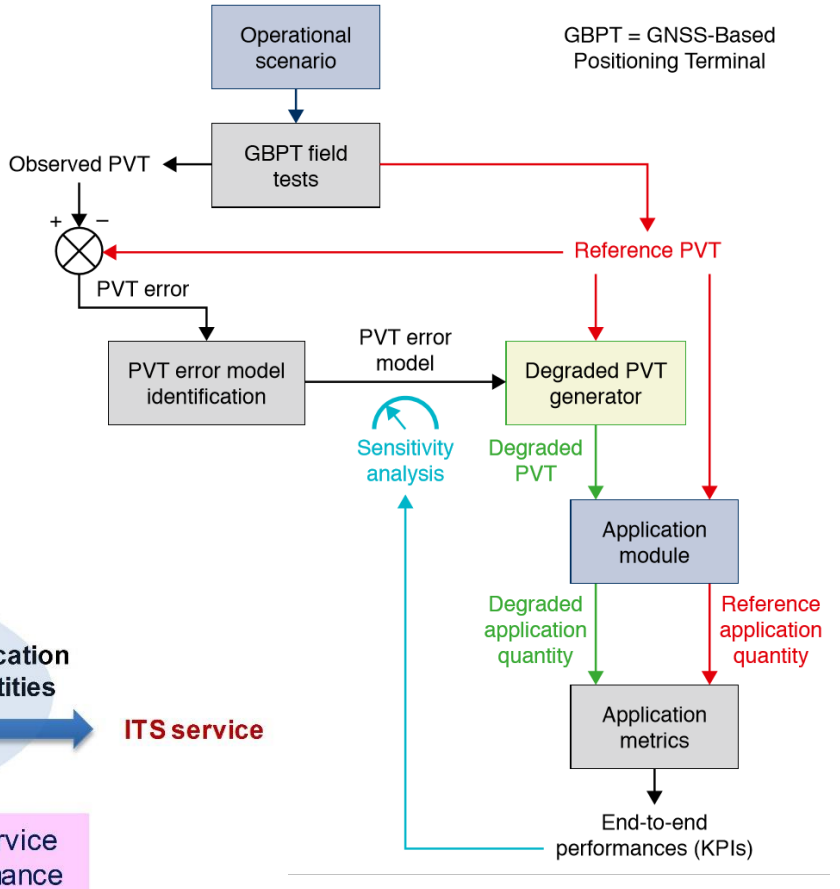
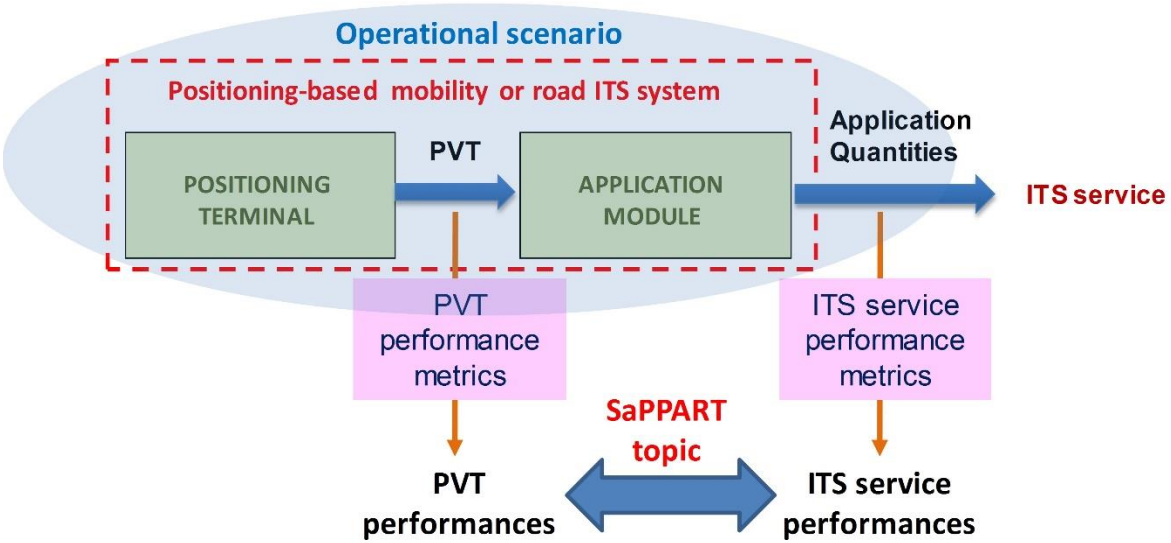
Handbook

- Highlights





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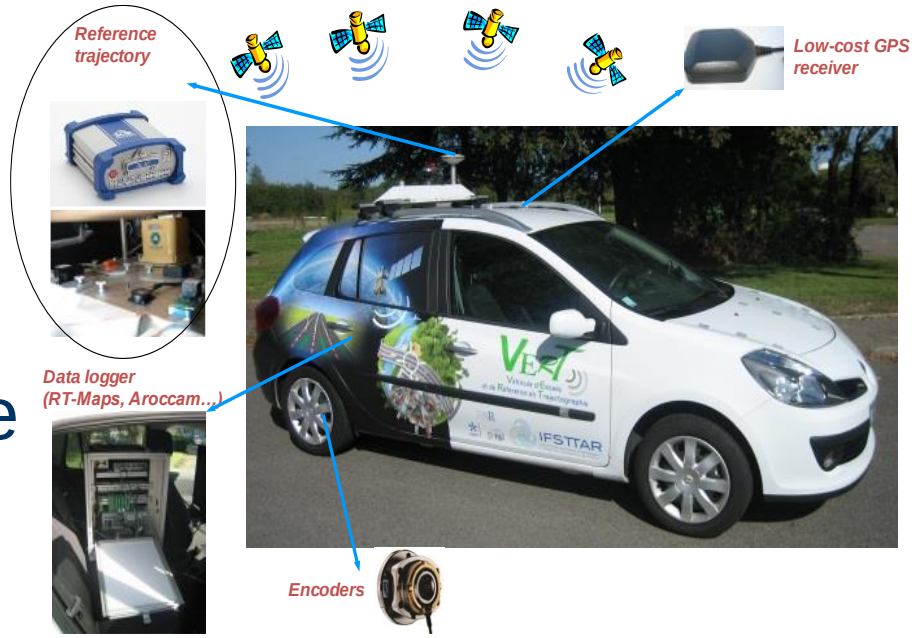
Guidelines

- Goal: to provide guidelines for generic test procedures for the evaluation of GNSS-based Positioning terminals (GBPT) performance, either by field tests, simulations or their combination



- Status
  - Under preparation
  - To be published in December 2017

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Conclusion

- Contribution of SaPPART to the working groups of standardization (CEN, ISO)
- SaPPART has demonstrated the absolute necessity of the positioning assessment for very demanding applications
- SaPPART has contributed to the improvement of the synergy between groups of stakeholders
  - When GNSS people meet ITS world

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THANK YOU FOR YOUR ATTENTION !

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ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

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White Paper

- **Goal**: to inform the key actors of the terrestrial transport sector on the issues andthe impacts of positioning quality in applications, more specifically in Intelligent Transport Systems
- **Role of positioning systems** in transportation and the necessity to correctly assess their performance
- **Fundamentals of positioning systems** with a particular focus on GNSSs
- **Positioning terminal architecture** and the parameters used for the characterization of performance such as availability, accuracy and integrity

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Handbook

- Focus on **positioning performance issues** according to the requirements of ITS applications
- **Role of positioning information** in some emblematic applications
- Introduction to a **simulation method for sensitivity analysis**
- Discussion of the **error sources** at the terminal level and introduction to a model of the horizontal position error
- Application of the error model and the sensitivity analysis to two examples of ITS systems (Road User Charging and eCall)

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